Manitoba
Energy and Mines
Mines Branch

Aggregate Report AR91-2

Aggregate Resource Inventory of the Rural Municipality of Strathcona

by R.V. Young

Energy and Mines

Hon. James E. Downey
Minister

Ian Haugh
Deputy Minister

Mines Branch

T. Batchelor
Director

This publication is available in large print, audiotape or braille on request

ABSTRACT

An aggregate resource inventory was carried out in the Rural Municipality of Strathcona. Airphoto interpretation, followed by field investigations, was used to identify and define sand and gravel deposits. Twenty sand and gravel deposits were identified which contained 13 sand and gravel pits, and 9 borrow pits. In addition, 3 shale bedrock quarries, and 9 sand and gravel occurrences overlain by silt or till were noted that are potential sources of aggregate were identified. Estimated reserves are in excess of 52.4 million cubic metres. The sand and gravel is characterized by high shale content.

93-00875/

TABLE OF CONTENTS

	Page
Abstract	iii
Introduction	1
Objectives	1
Location and Access	1
Methodology	1
Previous Work	1
Acknowledgements	1
Aggregate Resources	2
References	3
Appendix A: Exposure Data	4
Appendix B: Grain Size Classification	35
Appendix C: Glossary	36

FIGURES

Figure 1: Location of the Rural Municipality of Strathcona vi

MAP

Map AR91-2: Aggregate Resources in the Rural Municipality of Strathcona . . . . . in pocket

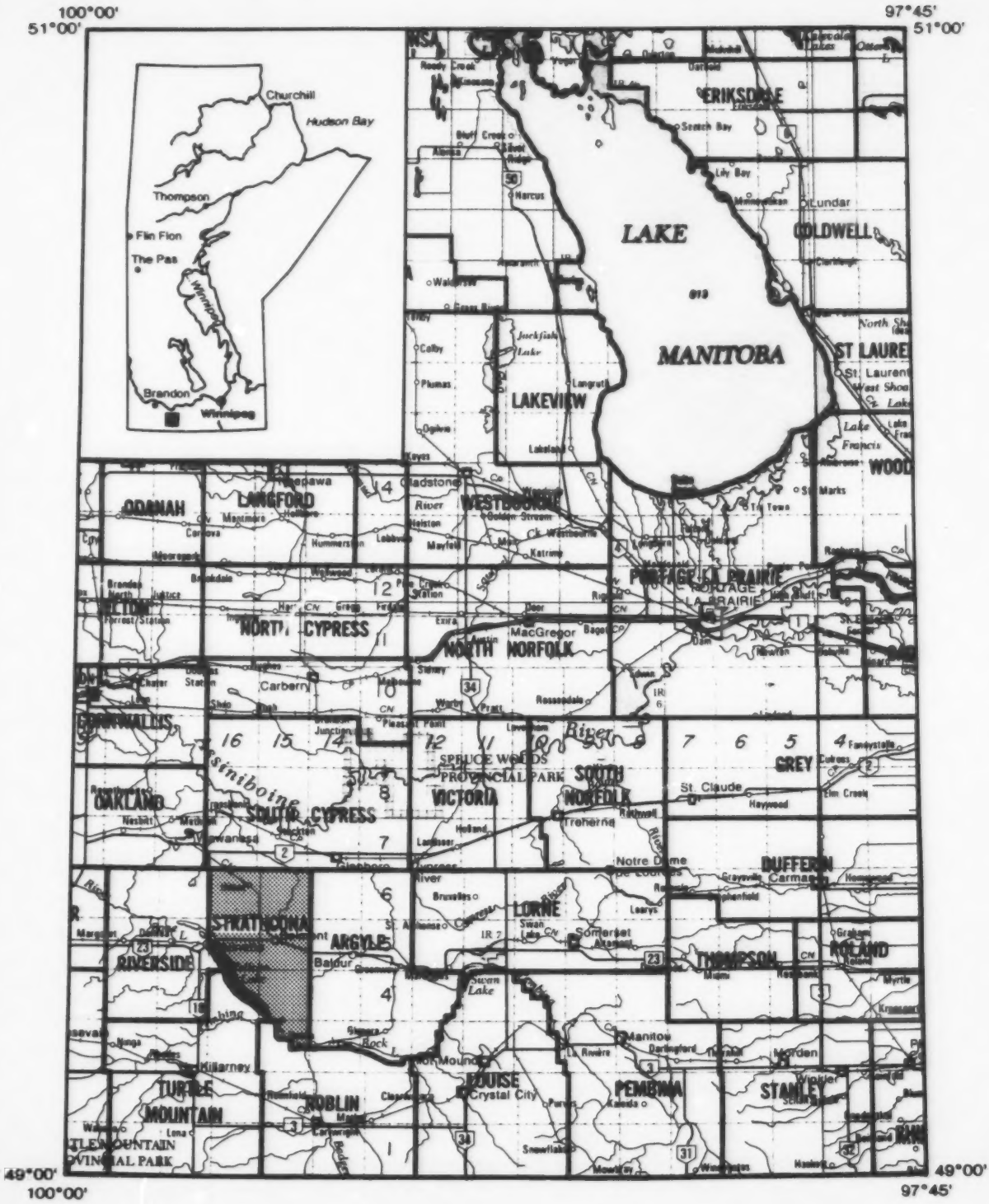


Figure 1: Location of the Rural Municpality of Strathcona.

INTRODUCTION

OBJECTIVES

An aggregate resource inventory was carried out in the Rural Municipality of Strathcona, with the objectives of determining the location, quality, and reserves of aggregate resources. The information contained within this report may be used to assist in land-use planning, resource management, and by consumers of sand and gravel.

LOCATION AND ACCESS

The study area (Fig. 1) encompasses 468 square kilometres located 175 kilometres southwest of Winnipeg. The Municipality includes Townships 3-6 and Ranges 15-16 west of Principal Meridian. The largest settlement is the Town of Belmont. Access is by Provincial Highways 23 and 18 and several provincial roads including P.R. 340 and 253. Although most of the municipality is accessible by section roads, large areas within the Tiger Hills comprise hilly terrain and swamp lands and are thus inaccessible.

METHODOLOGY

Geological field investigations were conducted during the summer of 1990. Airphotos at scales of 1:56 000 and 1:15 840 were used to identify potential aggregate deposits. Existing sand and gravel pits including borrow pits were examined and sampled. Undeveloped and potential deposits were tested by backhoe to a maximum depth of 4 m.

The coarse aggregate sample fraction (19.1 - 76.3 mm) was sieved in the field and weights recorded. Clast sizes greater than 76.3 mm (3") were recorded as sparse, moderate or abundant. A representative sample of the less than 19.1 mm size range was retained and sieved in the laboratory. Sizes less than 0.074 mm were recorded as combined silt/clay fraction.

The field sieved coarse aggregate was used to perform the petrographic analysis when sufficient sample was available. Each clast was classified according to rock type and the number of clasts for each rock type was counted. Rock types were grouped into four categories: good, fair, poor and deleterious according to their suitability as aggregate. The percent shale by weight was also calculated for the coarse fraction. The percent shale by weight was also calculated for the 4.76 - 9.5 mm size for selected samples.

Reserve estimates were calculated by multiplying deposit depth by deposit area, and adjusting the reserves for areas depleted or not available for mining. Surface and mineral ownership was recorded for each aggregate deposit.

PREVIOUS WORK

The surficial geology map by Conley (1986) was used to assist with the identification of potential aggregate deposits within the municipality. Manitoba Department of Highways and Transportation Services (1976, 1977) tested several gravel pits including backhoe testing of selected sites and grain size analysis of gravel samples.

ACKNOWLEDGEMENTS

Able field and laboratory assistance was provided by Gerald Olsen. Maps and figures were drafted by C. Wojciechowski. Mineral ownership data for the municipality was provided by the Crown Lands Branch. Shirley Weselak provided desktop publishing and D.A. Baldwin edited the manuscript.

AGGREGATE RESOURCES

Twenty aggregate deposits were identified within the municipality which contained 13 sand and gravel pits and 9 borrow pits. In addition, there are 3 shale bedrock quarries and 9 sand and gravel occurrences overlain by silt or till which may also be potential sources of aggregate. Total reserves within the study area are 52.4 million cubic metres, which includes 38 million cubic metres of sand. Forty-four sites were tested by backhoe and 32 samples were analyzed. The major deletrious material within the samples was shale. Exposure and deposit information is provided in Appendix A. This information includes deposit reserves, exposure data, sieve and petrographic analysis. The location of deposits, exposures and backhoe test sites are shown on Map AR91-2.

Sand and gravel deposits consist of outwash emanating from The Darlingford Moraine, outwash and terraces associated with meltwater channels, and eskers and crevasse fills. The only active mining area is deposit 11964 located 4 kilometres northeast of Ninette. This deposit consists of ice contact coarse sand and gravel along the southern flank of The Darlingford Moraine. This deposit grades to fine sand of deposit 11963.

REFERENCES

Conley, G.G.

1986: Surficial geology and stratigraphy of the Killarney-Holmfield area, southwestern Manitoba; University of Manitoba, M.Sc Thesis (unpublished), 165p.

Manitoba Department of Highways and Transportation.

1976: Aggregate Resource Inventory Block File 4 and 5, Geotechnical Section, Materials and Research Division.

1977: Aggregate Resource Inventory Block File 16 and 17, Geotechnical Section, Materials and Research Division.

APPENDIX A: EXPOSURE DATA

DEPOSIT # 011958

INITIAL LOCATION	PERCENT RESERVES (m^3)	REMAINING DEPLETED	RESERVES (m^3)	OWNER (SURFACE/GRAVEL)	OWNER 2 (SURFACE/GRAVEL)
SW-18-006-16W	25000	0	25000	PRIVATE/PRIVATE	
	DEPOSIT RESERVES		25000		

EXPOSURE INFORMATION

EXPOSURE #: BB156 (SW-18-006-16W) VISITED: 90
EXPOSURE TYPE: BACKHOE TEST PIT LAND USE: HIGHWAY,ROADWAY,RAILWAY
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 0.0 METRES ESTIMATED STONE CONTENT: LOW
SECTION: A MATERIAL DESCRIPTION: SAND VENEER OVER SILT
SECTION HEIGHT: 3.5 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 0.0 M. OVERBURDEN THICKNESS: 0.0 M.
MATERIAL AT BASE: SILT
NO CHANNEL SAMPLE TAKEN
ADDITIONAL INFORMATION:
GENERAL STRATIGRAPHY:
0.0-1.0 M. MEDIUM SAND, OCCASIONAL PEBBLE
1.0-3.5 M. SILT, PEBBLE FREE, AND VERY FINE SAND

EXPOSURE #: RY633 (SW-18-006-16W) VISITED: 90
EXPOSURE TYPE: DITCH OR ROAD CUT LAND USE: HIGHWAY,ROADWAY,RAILWAY
SURROUNDING LAND USE: FOREST NATURAL
ECONOMIC THICKNESS: 1.5 METRES ESTIMATED STONE CONTENT: MEDIUM HIGH
SECTION: A MATERIAL DESCRIPTION: GRAVEL RIDGE FLANKED BY TILL
SECTION HEIGHT: 3.0 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 0.0 M. OVERBURDEN THICKNESS: 0.0 M.
MATERIAL AT BASE: TILL
NO CHANNEL SAMPLE TAKEN
ADDITIONAL INFORMATION:
GENERAL STRATIGRAPHY:

DEPOSIT # 011959

INITIAL LOCATION	PERCENT RESERVES (m^3)	REMAINING DEPLETED	RESERVES (m^3)	OWNER (SURFACE/GRAVEL)	OWNER 2 (SURFACE/GRAVEL)
SE-07-006-16W	60000	30	42000	PRIVATE/PRIVATE	
SW-07-006-16W	220000	40	132000	PRIVATE/PRIVATE	
	DEPOSIT RESERVES		174000		

EXPOSURE INFORMATION

EXPOSURE #: RY612 (SE-07-006-16W) VISITED: 90
EXPOSURE TYPE: SAND AND GRAVEL PIT LAND USE: PIT-NOT IN USE(COMMONLY REVEGETATED)
SURROUNDING LAND USE: PASTURE,GRAZING
ECONOMIC THICKNESS: 4.0 METRES ESTIMATED STONE CONTENT: MEDIUM HIGH
SECTION: A MATERIAL DESCRIPTION: COARSE PEBBLE GRAVEL OVER SAND
SECTION HEIGHT: 4.0 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 3.0 M. OVERBURDEN THICKNESS: 0.2 M.
MATERIAL AT BASE: SAND
SEE SIEVE ANALYSIS AND PETROGRAPHIC ANALYSIS
ADDITIONAL INFORMATION:
PIT USED TO RESURFACE HIGHWAY 18,
DIRTY GRAVEL WITH TILL, SILT AND FINE
SAND LENSES

GENERAL STRATIGRAPHY:
0.0-0.2 M. SOIL
0.2-4.0 M. COARSE PEBBLE GRAVEL AND SAND LENSES
4.0 FINE-MEDIUM PEBBLY SAND

EXPOSURE #: RY613 (SW-07-006-16W)VISITED:90
EXPOSURE TYPE: SAND AND GRAVEL PIT LAND USE: PIT-NOT IN USE(COMMONLY REVEGETATED)
SURROUNDING LAND USE: PASTURE,GRAZING
ECONOMIC THICKNESS: 4.0 METRES ESTIMATED STONE CONTENT: MEDIUM HIGH
SECTION: A MATERIAL DESCRIPTION: COARSE SANDY PEBBLE GRAVEL
SECTION HEIGHT: 4.0 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 3.0 M. OVERBURDEN THICKNESS: 0.2 M.
MATERIAL AT BASE: SAND AND GRAVEL
SEE SIEVE ANALYSIS AND PETROGRAPHIC ANALYSIS
ADDITIONAL INFORMATION:
DIRTY GRAVEL, PIT USED FOR HIGHWAY 18,
BOULDERS ON SURFACE

GENERAL STRATIGRAPHY:
0.0-0.2 M. SOIL
0.2-4.0 M. COARSE SANDY PEBBLE GRAVEL WITH SILT, SAND AND TILL LENSES, MASSIVE

SIEVE ANALYSIS

	PERCENT PASSING											
	OVERSIZED	3.0	1.5	3/4	3/8	#4	#8	#16	#30	#50	#100	#200 (PLUS 6")
RY612 A (SE-07-006-16W)		100	98	92	87	80	74	64	49	34	26	22 ABUNDANT
RY613 A (SW-07-006-16W)		99	96	85	70	60	52	45	40	31	20	15 ABUNDANT

(NOTE: ALL SAMPLES ARE 100% PASSING 6 INCHES)

PETROGRAPHIC ANALYSIS(19.1-38.1 mm.)

SAMPLE	% GOOD	% FAIR	% POOR	% DELETERIOUS	% SHALE (BY WEIGHT)	COMMENTS
RY612 A	25	44	2	30	14	SHALE 4.7-9.5 MM. = 22 %
RY613 A	39	0	57	4	***	SHALE 4.7-9.5 MM. = 4 %

DEPOSIT # 011960

INITIAL LOCATION	PERCENT RESERVES (m^3)	REMAINING DEPLETED	RESERVES (m^3)	OWNER (SURFACE/GRAVEL)	OWNER 2 (SURFACE/GRAVEL)
NE-06-006-16W	200000	0	200000	PRIVATE/PRIVATE	
SE-07-006-16W	40000	0	40000	PRIVATE/PRIVATE	
	DEPOSIT RESERVES		240000		

EXPOSURE INFORMATION

EXPOSURE #: BB153 (SE-07-006-16W) VISITED: 90
EXPOSURE TYPE: BACKHOE TEST PIT LAND USE: HIGHWAY,ROADWAY,RAILWAY
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 3.5 METRES ESTIMATED STONE CONTENT: MEDIUM
SECTION: A MATERIAL DESCRIPTION: PEBBLY COARSE SAND WITH TILL LENS
SECTION HEIGHT: 4.0 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 3.0 M. OVERBURDEN THICKNESS: 0.0 M.
MATERIAL AT BASE: SAND AND GRAVEL
SEE SIEVE ANALYSIS AND PETROGRAPHIC ANALYSIS
ADDITIONAL INFORMATION:
GENERAL STRATIGRAPHY:
0.0-0.5 M. SANDY PEBBLE GRAVEL
0.5-1.5 M. SILTY TILL
1.5-4.0 M. PEBBLY COARSE SAND, OCCASIONAL COBBLE

EXPOSURE #: RY604 (SE-07-006-16W) VISITED: 90
EXPOSURE TYPE: DITCH OR ROAD CUT LAND USE: AGRICULTURE,HAYING
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 0.0 METRES ESTIMATED STONE CONTENT: LOW
SECTION: A MATERIAL DESCRIPTION: TILL OVER SILTY FINE SAND
SECTION HEIGHT: 1.0 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 0.0 M. OVERBURDEN THICKNESS: 1.0 M.
MATERIAL AT BASE: SAND
NO CHANNEL SAMPLE TAKEN
ADDITIONAL INFORMATION:
GENERAL STRATIGRAPHY:
1.0 M. TILL OVER SILTY FINE SAND

SIEVE ANALYSIS

	PERCENT PASSING											
	OVERSIZED	3.0	1.5	3/4	3/8	#4	#8	#16	#30	#50	#100	#200 (PLUS 6")
BB153 A (SE-07-006-16W)	100	97	86	78	66	57	48	39	27	17	14	SPARSE

(NOTE: ALL SAMPLES ARE 100% PASSING 6 INCHES)

PETROGRAPHIC ANALYSIS(19.1-38.1 mm.)

SAMPLE	% GOOD	% FAIR	% POOR	% DELETERIOUS	% SHALE (BY WEIGHT)	COMMENTS
BB153 A	6	0	2	92	83	SHALE 4.7-9.5 MM. = 83 %

DEPOSIT # 011961

INITIAL LOCATION	PERCENT RESERVES (m^3)	REMAINING DEPLETED	RESERVES (m^3)	OWNER (SURFACE/GRAVEL)	OWNER 2 (SURFACE/GRAVEL)
NW-06-006-16W	760000	0	760000	PRIVATE/PRIVATE	
	DEPOSIT RESERVES		760000		

EXPOSURE INFORMATION

EXPOSURE #: RY618 (NE-01-006-17W) VISITED: 90
EXPOSURE TYPE: SAND AND GRAVEL PIT LAND USE: PIT-TEMPORARY USE
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 4.0 METRES ESTIMATED STONE CONTENT: LOW
SECTION: A MATERIAL DESCRIPTION: FINE SAND OCCASIONAL PEBBLE BED
SECTION HEIGHT: 4.0 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 2.0 M. OVERBURDEN THICKNESS: 0.2 M.
MATERIAL AT BASE: SAND
SEE SIEVE ANALYSIS AND PETROGRAPHIC ANALYSIS
ADDITIONAL INFORMATION: GENERAL STRATIGRAPHY:
PARTIALLY REVEGETATED PIT, 20 000 0.0-0.2 M. SOIL
CUBIC METRES REMOVED 0.2-3.5 M. FINE SAND WITH PEBBLE AND SILT BEDS

SIEVE ANALYSIS

	PERCENT PASSING											
	OVERSIZED	3.0	1.5	3/4	3/8	#4	#8	#16	#30	#50	#100	#200 (PLUS 6")
RY618 A (NE-01-006-17W)		100	99	93	86	78	71	62	50	31	13	8 SPARSE

(NOTE: ALL SAMPLES ARE 100% PASSING 6 INCHES)

PETROGRAPHIC ANALYSIS(19.1-38.1 mm.)

SAMPLE	% GOOD	% FAIR	% POOR	% DELETERIOUS	% SHALE (BY WEIGHT)	COMMENTS
RY618 A	21	1	59	18	15	SHALE 4.7-9.5 MM. = 51 %

DEPOSIT # 011962

INITIAL LOCATION	PERCENT RESERVES (m^3)	REMAINING DEPLETED	RESERVES (m^3)	OWNER (SURFACE/GRAVEL)	OWNER 2 (SURFACE/GRAVEL)
NW-31-005-16W	1200000	0	1200000	PRIVATE/PRIVATE	
SW-06-006-16W	1640000	5	1558000	PRIVATE/PRIVATE	
	DEPOSIT RESERVES		2758000		

EXPOSURE INFORMATION

EXPOSURE #: BB150 (SW-06-006-16W) VISITED: 90
EXPOSURE TYPE: BACKHOE TEST PIT LAND USE: HIGHWAY,ROADWAY,RAILWAY
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 0.0 METRES ESTIMATED STONE CONTENT: LOW
SECTION: A MATERIAL DESCRIPTION: FINE-MEDIUM SAND
SECTION HEIGHT: 4.0 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 2.0 M. OVERBURDEN THICKNESS: 0.3 M.
MATERIAL AT BASE: SAND
SEE SIEVE ANALYSIS AND PETROGRAPHIC ANALYSIS
ADDITIONAL INFORMATION: GENERAL STRATIGRAPHY:
0.0-0.3 M. SOIL
0.3-2.5 M. FINE-MEDIUM SAND
2.5-3.0 M. SILT
3.5-4.0 M. PEBBLY COARSE SAND, OCCASIONAL COBBLE

EXPOSURE #: RY605 (SW-06-006-16W) VISITED: 90
EXPOSURE TYPE: SAND AND GRAVEL PIT LAND USE: PIT-NOT IN USE(COMMONLY REVEGETATED)
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 4.0 METRES ESTIMATED STONE CONTENT: LOW
SECTION: A MATERIAL DESCRIPTION: FINE-MEDIUM SAND OCCASIONAL PEBBLE
SECTION HEIGHT: 4.0 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 2.5 M. OVERBURDEN THICKNESS: 0.3 M.
MATERIAL AT BASE: SAND
SEE SIEVE ANALYSIS AND PETROGRAPHIC ANALYSIS
ADDITIONAL INFORMATION: GENERAL STRATIGRAPHY:
FARM USE BORROW PIT/DUGOUT

EXPOSURE #: RY614 (SW-06-006-16W) VISITED: 90
EXPOSURE TYPE: DITCH OR ROAD CUT LAND USE: HIGHWAY,ROADWAY,RAILWAY
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 3.0 METRES ESTIMATED STONE CONTENT: LOW
SECTION: A MATERIAL DESCRIPTION: FINE-MEDIUM SAND
SECTION HEIGHT: 3.0 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 2.5 M. OVERBURDEN THICKNESS: 0.3 M.
MATERIAL AT BASE: SAND
SEE SIEVE ANALYSIS AND PETROGRAPHIC ANALYSIS
ADDITIONAL INFORMATION: GENERAL STRATIGRAPHY:

EXPOSURE #: RY617 (SW-06-006-16W) VISITED: 90
EXPOSURE TYPE: DITCH OR ROAD CUT LAND USE: HIGHWAY,ROADWAY,RAILWAY
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 5.0 METRES ESTIMATED STONE CONTENT: LOW
SECTION: A MATERIAL DESCRIPTION: FINE SAND PEBBLE FREE
SECTION HEIGHT: 5.0 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 0.0 M. OVERBURDEN THICKNESS: 0.0 M.
MATERIAL AT BASE: SAND
NO CHANNEL SAMPLE TAKEN
ADDITIONAL INFORMATION: GENERAL STRATIGRAPHY:

SIEVE ANALYSIS

	PERCENT PASSING											
OVERSIZED	3.0	1.5	3/4	3/8	#4	#8	#16	#30	#50	#100	#200	(PLUS 6")
BB150 A (SW-06-006-16W)	100	100	100	100	100	98	86	40	21	14	10	SPARSE
RY605 A (SW-06-006-16W)	100	100	100	100	100	96	82	53	26	18	16	SPARSE
RY614 A (SW-06-006-16W)	100	100	100	100	99	98	95	77	17	9	8	SPARSE

(NOTE: ALL SAMPLES ARE 100% PASSING 6 INCHES)

DEPOSIT # 011963

INITIAL LOCATION	PERCENT RESERVES (m^3)	REMAINING DEPLETED	RESERVES (m^3)	OWNER (SURFACE/GRAVEL)	OWNER 2 (SURFACE/GRAVEL)
NE-08-005-16W	60000	30	42000	PRIVATE/PRIVATE	
NW-09-005-16W	30000	70	9000	PRIVATE/PRIVATE	
NE-16-005-16W	285000	20	228000	PRIVATE/PRIVATE	
NW-16-005-16W	1919000	15	1631150	PRIVATE/PRIVATE	
SW-16-005-16W	540000	0	540000	PRIVATE/PRIVATE	
NE-17-005-16W	720000	0	720000	PRIVATE/PRIVATE	
SE-17-005-16W	472500	0	472500	PRIVATE/PRIVATE	
NE-20-005-16W	2240000	0	2240000	PRIVATE/PRIVATE	
NW-20-005-16W	1650000	10	1485000	PRIVATE/PRIVATE	
SE-20-005-16W	2052000	10	1846800	PRIVATE/PRIVATE	
SW-20-005-16W	15000	0	15000	PRIVATE/PRIVATE	
NE-21-005-16W	1040000	0	1040000	PRIVATE/PRIVATE	
NW-21-005-16W	1905000	0	1905000	PRIVATE/PRIVATE	
SE-21-005-16W	760000	0	760000	PRIVATE/PRIVATE	
SW-21-005-16W	2432000	0	2432000	PRIVATE/PRIVATE	
SW-28-005-16W	630000	10	567000	PRIVATE/PRIVATE	
NE-29-005-16W	580000	0	580000	PRIVATE/PRIVATE	
NW-29-005-16W	2560000	0	2560000	PRIVATE/PRIVATE	
SE-29-005-16W	2520000	15	2142000	PRIVATE/PRIVATE	
SW-29-005-16W	3410000	0	3410000	PRIVATE/PRIVATE	
NE-30-005-16W	1085000	10	976500	PRIVATE/PRIVATE	
SE-30-005-16W	522500	15	444125	PRIVATE/PRIVATE	
NE-31-005-16W	1225000	0	1225000	PRIVATE/PRIVATE	
NW-31-005-16W	90000	0	90000	PRIVATE/PRIVATE	
SE-31-005-16W	1410000	0	1410000	PRIVATE/PRIVATE	
SW-31-005-16W	465000	0	465000	PRIVATE/PRIVATE	
NE-32-005-16W	157500	0	157500	CROWN(PROVINCIAL)/CROWN	PRIVATE/PRIVATE
NW-32-005-16W	1890000	5	1795500	PRIVATE/PRIVATE	
SE-32-005-16W	1110000	15	943500	CROWN(PROVINCIAL)/CROWN	PRIVATE/PRIVATE
SW-32-005-16W	1920000	10	1728000	PRIVATE/PRIVATE	
SW-05-006-16W	612500	0	612500	PRIVATE/PRIVATE	
SE-06-006-16W	360000	0	360000	PRIVATE/PRIVATE	
	DEPOSIT RESERVES		34833075		

EXPOSURE INFORMATION

EXPOSURE #: BB139 (SW-21-005-16W) VISITED: 90
EXPOSURE TYPE: BACKHOE TEST PIT LAND USE: HIGHWAY,ROADWAY,RAILWAY
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 3.8 METRES ESTIMATED STONE CONTENT: LOW
SECTION: A MATERIAL DESCRIPTION: FINE SAND PEBBLE FREE
SECTION HEIGHT: 4.0 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 1.5 M. OVERBURDEN THICKNESS: 0.2 M.
MATERIAL AT BASE: SILT
SEE SIEVE ANALYSIS AND PETROGRAPHIC ANALYSIS
ADDITIONAL INFORMATION:
FINE SAND GRADING TO SILT,
UNECONOMIC

GENERAL STRATIGRAPHY:
0.0-0.2 M. SOIL
0.2-3.0 M. FINE SAND, PEBBLE FREE, BEDDING DIPPING SOUTHWARDS
3.0-3.8 M. SILTY FINE SAND
3.8-4.0 M. BEDDED SILT

EXPOSURE #: BB140 (SE-17-005-16W) VISITED: 90
EXPOSURE TYPE: BACKHOE TEST PIT LAND USE: HIGHWAY,ROADWAY,RAILWAY
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 2.7 METRES ESTIMATED STONE CONTENT: LOW
SECTION: A MATERIAL DESCRIPTION: MEDIUM GRAINED SAND
SECTION HEIGHT: 3.5 M. DEPTH TO WATER TABLE: 2.0 M.
HEIGHT SAMPLED: 0.0 M. OVERBURDEN THICKNESS: 0.8 M.
MATERIAL AT BASE: BEDROCK
NO CHANNEL SAMPLE TAKEN
ADDITIONAL INFORMATION:
HOLE CAVING IN AT 2.0 M.

GENERAL STRATIGRAPHY:
0.0-0.8 M. SOIL
0.8-3.5 M. MEDIUM SAND, PEBBLE FREE
3.5 SHALE BEDROCK

EXPOSURE #: BB145 (SW-28-005-16W) VISITED: 90
EXPOSURE TYPE: BACKHOE TEST PIT LAND USE: HIGHWAY,ROADWAY,RAILWAY
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 4.0 METRES ESTIMATED STONE CONTENT: LOW
SECTION: A MATERIAL DESCRIPTION: FINE SAND
SECTION HEIGHT: 4.0 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 2.0 M. OVERBURDEN THICKNESS: 0.2 M.
MATERIAL AT BASE: SAND
SEE SIEVE ANALYSIS AND PETROGRAPHIC ANALYSIS
ADDITIONAL INFORMATION:

GENERAL STRATIGRAPHY:
0.0-0.2 M. SOIL
0.2-1.5 M. SILT
1.5-4.0 M. FINE SAND OCCASIONAL SILT BED PEBBLE FREE

EXPOSURE #: RY594 (NW-09-005-16W) VISITED: 90
EXPOSURE TYPE: BORROW PIT LAND USE: PIT-TEMPORARY USE
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 1.5 METRES ESTIMATED STONE CONTENT: LOW
SECTION: A MATERIAL DESCRIPTION: FINE SAND
SECTION HEIGHT: 1.5 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 1.5 M. OVERBURDEN THICKNESS: 0.1 M.
MATERIAL AT BASE: SAND
SEE SIEVE ANALYSIS AND PETROGRAPHIC ANALYSIS
ADDITIONAL INFORMATION: GENERAL STRATIGRAPHY:
SILTY FINE SAND, OCCASIONAL PEBBLE,
10 CUBIC METRES REMOVED

EXPOSURE #: RY595 (SE-17-005-16W) VISITED: 90
EXPOSURE TYPE: BORROW PIT LAND USE: PIT-NOT IN USE(COMMONLY REVEGETATED)
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 1.8 METRES ESTIMATED STONE CONTENT: MEDIUM
SECTION: A MATERIAL DESCRIPTION: PEBBLY SAND
SECTION HEIGHT: 1.8 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 1.8 M. OVERBURDEN THICKNESS: 0.3 M.
MATERIAL AT BASE: TILL
SEE SIEVE ANALYSIS AND PETROGRAPHIC ANALYSIS
ADDITIONAL INFORMATION: GENERAL STRATIGRAPHY:
SHALE RICH PEBBLY SAND, REHABILITATED
BORROW PIT, 100 CUBIC METRES REMOVED,
PIT 20 M. X 10 M.

EXPOSURE #: RY597 (SE-30-005-16W) VISITED: 90
EXPOSURE TYPE: BORROW PIT LAND USE: PIT-NOT IN USE(COMMONLY REVEGETATED)
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 5.5 METRES ESTIMATED STONE CONTENT: LOW
SECTION: A MATERIAL DESCRIPTION: SILTY FINE SAND
SECTION HEIGHT: 5.5 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 4.0 M. OVERBURDEN THICKNESS: 0.3 M.
MATERIAL AT BASE: SAND
SEE SIEVE ANALYSIS AND PETROGRAPHIC ANALYSIS
ADDITIONAL INFORMATION: GENERAL STRATIGRAPHY:
DUGOUT/BORROW PIT, MASSIVE SILTY FINE
SAND, 50 CUBIC METRES REMOVED,
UNECONOMIC.

EXPOSURE #: RY615 (SE-06-006-16W) VISITED: 90
EXPOSURE TYPE: DITCH OR ROAD CUT LAND USE: HIGHWAY,ROADWAY,RAILWAY
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 3.0 METRES ESTIMATED STONE CONTENT: LOW
SECTION: A MATERIAL DESCRIPTION: FINE SAND
SECTION HEIGHT: 3.0 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 0.0 M. OVERBURDEN THICKNESS: 0.0 M.
MATERIAL AT BASE: SAND
NO CHANNEL SAMPLE TAKEN
ADDITIONAL INFORMATION: GENERAL STRATIGRAPHY:

EXPOSURE #: RY616 (NW-32-005-16W) VISITED: 90
EXPOSURE TYPE: BORROW PIT LAND USE: ACTIVE PIT
SURROUNDING LAND USE: PASTURE,GRAZING
ECONOMIC THICKNESS: 3.5 METRES ESTIMATED STONE CONTENT: LOW
SECTION: A MATERIAL DESCRIPTION: MEDIUM SAND OCCASIONAL PEBBLE
SECTION HEIGHT: 3.5 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 3.0 M. OVERBURDEN THICKNESS: 0.2 M.
MATERIAL AT BASE: SAND
SEE SIEVE ANALYSIS AND PETROGRAPHIC ANALYSIS
ADDITIONAL INFORMATION: GENERAL STRATIGRAPHY:
PIT 10 M. X 6 M.,

EXPOSURE #: RY622 (NW-29-005-16W) VISITED: 90
EXPOSURE TYPE: DITCH OR ROAD CUT LAND USE: HIGHWAY,ROADWAY,RAILWAY
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 4.0 METRES ESTIMATED STONE CONTENT: LOW
SECTION: A MATERIAL DESCRIPTION: SHALE RICH PEBBLY COARSE SAND
SECTION HEIGHT: 4.0 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 3.0 M. OVERBURDEN THICKNESS: 0.2 M.
MATERIAL AT BASE: SAND
SEE SIEVE ANALYSIS AND PETROGRAPHIC ANALYSIS
ADDITIONAL INFORMATION: GENERAL STRATIGRAPHY:
0.0-0.2 M. SOIL
0.2-4.0 M. SHALE RICH PEBBLY COARSE SAND MASSIVE-POOR HORIZONTAL BEDDING

EXPOSURE #: RY623 (NW-20-005-16W) VISITED: 90
EXPOSURE TYPE: DITCH OR ROAD CUT LAND USE: HIGHWAY,ROADWAY,RAILWAY
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 6.0 METRES ESTIMATED STONE CONTENT: LOW
SECTION: A MATERIAL DESCRIPTION: FINE-MEDIUM SAND OCCASIONAL PEBBLE
SECTION HEIGHT: 6.0 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 0.0 M. OVERBURDEN THICKNESS: 0.2 M.
MATERIAL AT BASE: SAND
NO CHANNEL SAMPLE TAKEN
ADDITIONAL INFORMATION: GENERAL STRATIGRAPHY:

SIEVE ANALYSIS

	PERCENT PASSING											
	OVERSIZED	3.0	1.5	3/4	3/8	#4	#8	#16	#30	#50	#100	#200 (PLUS 6")
BB139 A (SW-21-005-16W)	100	100	100	100	100	99	94	78	42	19	13	SPARSE
BB145 A (SW-28-005-16W)	100	100	100	100	100	100	100	100	99	71	21	SPARSE
RY594 A (NW-09-005-16W)	100	100	100	99	98	98	97	89	22	9	8	SPARSE
RY595 A (SE-17-005-16W)	100	99	91	84	73	62	53	44	20	12	11	SPARSE
RY597 A (SE-30-005-16W)	100	100	100	100	100	100	100	98	59	20	13	SPARSE
RY616 A (NW-32-005-16W)	100	100	99	99	94	88	79	67	47	21	11	SPARSE
RY622 A (NW-29-005-16W)	100	99	94	86	79	72	56	35	21	17	16	SPARSE

(NOTE: ALL SAMPLES ARE 100% PASSING 6 INCHES)

PETROGRAPHIC ANALYSIS(19.1-38.1 mm.)

SAMPLE	% GOOD	% FAIR	% POOR	% DELETERIOUS	% SHALE (BY WEIGHT)	COMMENTS
RY622 A	2	0	1	97	***	SHALE 4.7-9.5 MM. = 92%
RY595 A	11	0	6	83	69	SHALE 4.7-9.5 MM. = 90%

DEPOSIT # 011964

INITIAL LOCATION	PERCENT RESERVES (m^3)	REMAINING DEPLETED	RESERVES (m^3)	OWNER (SURFACE/GRAVEL)	OWNER 2 (SURFACE/GRAVEL)
NW-15-005-16W	195000	99	1950	PRIVATE/PRIVATE	
NE-16-005-16W	15000	99	150	PRIVATE/PRIVATE	
NE-21-005-16W	1220000	0	1220000	PRIVATE/PRIVATE	
NW-21-005-16W	60000	0	60000	PRIVATE/PRIVATE	
SE-21-005-16W	1620000	25	1215000	PRIVATE/PRIVATE	
SW-22-005-16W	80000	0	80000	PRIVATE/PRIVATE	
NE-28-005-16W	15000	0	15000	PRIVATE/PRIVATE	
NW-28-005-16W	1305000	10	1174500	PRIVATE/PRIVATE	
SE-28-005-16W	1330000	25	997500	PRIVATE/PRIVATE	
SW-28-005-16W	1840000	0	1840000	PRIVATE/PRIVATE	
NE-29-005-16W	1780000	0	1780000	PRIVATE/PRIVATE	
SE-29-005-16W	80000	0	80000	PRIVATE/PRIVATE	
SE-32-005-16W	520000	0	520000	CROWN(PROVINCIAL)/CROWN	PRIVATE/PRIVATE
SW-33-005-16W	150000	30	105000	PRIVATE/PRIVATE	
	DEPOSIT RESERVES		9089100		

EXPOSURE INFORMATION

EXPOSURE #: BB147 (SE-32-005-16W)
EXPOSURE TYPE: BACKHOE TEST PIT
VISITED: 90
LAND USE: HIGHWAY,ROADWAY,RAILWAY
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 4.0 METRES
ESTIMATED STONE CONTENT: LOW
SECTION: A MATERIAL DESCRIPTION: PEBBLY SAND HIGH SILT
SECTION HEIGHT: 4.0 M.
DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 2.0 M.
OVERBURDEN THICKNESS: 0.8 M.
MATERIAL AT BASE: SAND AND GRAVEL
SEE SIEVE ANALYSIS AND PETROGRAPHIC ANALYSIS
ADDITIONAL INFORMATION:

GENERAL STRATIGRAPHY:
0.0-0.8 M. SOIL
0.8-2.5 M. PEBBLY SAND, HIGH SILT
2.5-3.5 M. SANDY PEBBLE GRAVEL, HIGH SHALE
3.5-4.0 M. PEBBLY SAND, HIGH SILT

EXPOSURE #: BB148 (NE-29-005-16W) VISITED: 90
EXPOSURE TYPE: BACKHOE TEST PIT LAND USE: HIGHWAY,ROADWAY,RAILWAY
SURROUNDING LAND USE: WILDLIFE HABITAT-NATURAL, UNATTENDED
ECONOMIC THICKNESS: 4.0 METRES ESTIMATED STONE CONTENT :
SECTION: A MATERIAL DESCRIPTION: PEBBLY FINE SAND
SECTION HEIGHT: 4.0 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 2.5 M. OVERBURDEN THICKNESS: 0.3 M.
MATERIAL AT BASE: SAND
SEE SIEVE ANALYSIS AND PETROGRAPHIC ANALYSIS
ADDITIONAL INFORMATION:
GENERAL STRATIGRAPHY:
0.0-0.3 M. SOIL
0.3-2.7 M. PEBBLY FINE SAND
2.7-4.0 M. PEBBLY MEDIUM SAND

EXPOSURE #:RY596 (SE-21-005-16W)VISITED:90
EXPOSURE TYPE: SAND AND GRAVEL PIT LAND USE: PIT-NOT IN USE(COMMONLY REVEGETATED)
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 4.0 METRES ESTIMATED STONE CONTENT: MEDIUM HIGH
SECTION: A MATERIAL DESCRIPTION: COARSE PEBBLY SAND
SECTION HEIGHT: 4.0 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 3.0 M. OVERBURDEN THICKNESS: 0.3 M.
MATERIAL AT BASE: GRAVEL
SEE SIEVE ANALYSIS AND PETROGRAPHIC ANALYSIS
ADDITIONAL INFORMATION:
LARGE PIT NOT IN USE, PARTIALLY OVERGROWN, PIT 200 M. X 200 M., GOOD QUALITY, 100 000 CUBIC METRES REMOVED, POORLY MINED.
GENERAL STRATIGRAPHY:

EXPOSURE #: RY598 (SE-28-005-16W) VISITED: 90
EXPOSURE TYPE: SAND AND GRAVEL PIT LAND USE: ACTIVE PIT
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 3.5 METRES ESTIMATED STONE CONTENT: MEDIUM LOW
SECTION: A MATERIAL DESCRIPTION: PEBBLY COARSE SAND
SECTION HEIGHT: 3.5 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 3.0 M. OVERBURDEN THICKNESS: 0.3 M.
MATERIAL AT BASE: SAND AND GRAVEL
SEE SIEVE ANALYSIS AND PETROGRAPHIC ANALYSIS
ADDITIONAL INFORMATION:
ACTIVE MUNICIPAL PIT, STOCKPILES <2.5 CM. AND >2.5 CM. MATERIAL, AT LEAST 50 000 CUBIC METRES REMOVED, PIT PARTIALLY OVERGROWN.
GENERAL STRATIGRAPHY:
0.0-1.5 M. HORIZONTALLY BEDDED PEBBLY COARSE SAND
1.5-2.5 M. PEBBLY FINE SAND
2.5-3.5 M. PEBBLY COARSE SAND

EXPOSURE #: RY599 (SE-28-005-16W) VISITED: 90
EXPOSURE TYPE: SAND AND GRAVEL PIT LAND USE: PIT-TEMPORARY USE
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 3.5 METRES ESTIMATED STONE CONTENT: MEDIUM
SECTION: A MATERIAL DESCRIPTION: PEBBLY COARSE SAND
SECTION HEIGHT: 3.5 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 2.0 M. OVERBURDEN THICKNESS: 0.3 M.
MATERIAL AT BASE: SAND AND GRAVEL
SEE SIEVE ANALYSIS AND PETROGRAPHIC ANALYSIS
ADDITIONAL INFORMATION:
DEPOSIT GRADES TO SANDIER GRAVEL WEST FROM RY599
GENERAL STRATIGRAPHY:
0.0-3.5 M. POOR HORIZONTALLY BEDDED PEBBLY COARSE SAND

EXPOSURE #: RY600 (NW-28-005-16W) VISITED: 90
EXPOSURE TYPE: SAND AND GRAVEL PIT LAND USE: ACTIVE PIT
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 2.0 METRES ESTIMATED STONE CONTENT: LOW
SECTION: A MATERIAL DESCRIPTION: PEBBLY SAND
SECTION HEIGHT: 2.0 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 1.5 M. OVERBURDEN THICKNESS: 0.3 M.
MATERIAL AT BASE: SAND AND GRAVEL
SEE SIEVE ANALYSIS AND PETROGRAPHIC ANALYSIS
ADDITIONAL INFORMATION:
PIT 60 M. X 60 M., EAST SIDE OF PIT FINE PEBBLYSAND
GENERAL STRATIGRAPHY:

EXPOSURE #: RY601 (SW-33-005-16W) VISITED: 90
EXPOSURE TYPE: SAND AND GRAVEL PIT LAND USE: PIT-TEMPORARY USE
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 2.5 METRES ESTIMATED STONE CONTENT: MEDIUM LOW
SECTION: A MATERIAL DESCRIPTION: COBBLY PEBBLE GRAVEL
SECTION HEIGHT: 2.5 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 2.0 M. OVERBURDEN THICKNESS: 0.3 M.
MATERIAL AT BASE: SAND AND GRAVEL
SEE SIEVE ANALYSIS AND PETROGRAPHIC ANALYSIS
ADDITIONAL INFORMATION:
PIT 50 M. X 50 M.,50 CUBIC METRES STOCKPILES OF <2.5 CM. AND >2.5 CM. MATERIAL, ABUNDANT OVERSIZE.
GENERAL STRATIGRAPHY:

EXPOSURE #: RY621 (NE-21-005-16W) VISITED: 90
EXPOSURE TYPE: DITCH OR ROAD CUT LAND USE: HIGHWAY,ROADWAY,RAILWAY
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 4.0 METRES ESTIMATED STONE CONTENT: LOW
SECTION: A MATERIAL DESCRIPTION: FINE SAND PEBBLE FREE
SECTION HEIGHT: 4.0 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 0.0 M. OVERBURDEN THICKNESS: 0.2 M.
MATERIAL AT BASE: SAND
NO CHANNEL SAMPLE TAKEN
ADDITIONAL INFORMATION:
GENERAL STRATIGRAPHY:

SIEVE ANALYSIS

	PERCENT PASSING											
	OVERSIZED	3.0	1.5	3/4	3/8	#4	#8	#16	#30	#50	#100	#200 (PLUS 6")
BB147 A (SE-32-005-16W)	100	98	93	87	79	71	63	54	41	27	20	SPARSE
BB148 A (NE-29-005-16W)	100	100	97	93	86	77	66	51	27	10	8	SPARSE
RY596 A (SE-21-005-16W)	99	93	84	78	69	60	51	41	26	14	10	ABUNDANT
RY598 A (SE-28-005-16W)	100	98	92	85	77	68	60	48	30	15	9	MODERATE
RY599 A (SE-28-005-16W)	100	99	94	89	81	72	62	50	32	17	12	SPARSE
RY600 A (NW-28-005-16W)	100	99	92	83	73	65	56	46	28	14	10	SPARSE
RY601 A (SW-33-005-16W)	97	91	82	68	58	50	42	34	24	15	11	ABUNDANT

(NOTE: ALL SAMPLES ARE 100% PASSING 6 INCHES)

PETROGRAPHIC ANALYSIS(19.1-38.1 mm.)

SAMPLE	% GOOD	% FAIR	% POOR	% DELETERIOUS	% SHALE (BY WEIGHT)	COMMENTS
RY596 A	0	27	67	6	8	SHALE 4.7-9.5 MM. = 20%
RY599 A	20	0	3	77	46	SHALE 4.7-9.5 MM. = 43%
RY598 A	34	38	13	16	15	SHALE 4.7-9.5 MM. = 21%
RY600 A	10	67	16	7	8	SHALE 4.7-9.5 MM. = 26%
RY601 A	31	0	55	14	11	SHALE 4.7-9.5 MM. = 14%
BB147 A	16	1	19	64	31	SHALE 4.7-9.5 MM. = 55%
BB148 A	12	0	8	80	68	SHALE 4.7-9.5 MM. = 75%

DEPOSIT # 011965

INITIAL LOCATION	PERCENT RESERVES (m^3)	REMAINING DEPLETED	RESERVES (m^3)	OWNER (SURFACE/GRAVEL)	OWNER 2 (SURFACE/GRAVEL)
NE-02-005-16W	20000	99	200	PRIVATE/PRIVATE	
NW-02-005-16W	20000	99	200	PRIVATE/PRIVATE	
NE-11-005-16W	20000	0	20000	PRIVATE/PRIVATE	
NW-11-005-16W	20000	0	20000	CROWN(PROVINCIAL)/CROWN	
SE-11-005-16W	687500	0	687500	PRIVATE/PRIVATE	
SW-11-005-16W	750000	15	637500	CROWN(PROVINCIAL)/CROWN	
	DEPOSIT RESERVES		1365400		

EXPOSURE INFORMATION

EXPOSURE #: RY592 (SW-11-005-16W) VISITED: 90
EXPOSURE TYPE: SAND AND GRAVEL PIT LAND USE: PIT-TEMPORARY USE
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 3.0 METRES ESTIMATED STONE CONTENT: MEDIUM HIGH
SECTION: A MATERIAL DESCRIPTION: COARSE PEBBLE GRAVEL
SECTION HEIGHT: 3.0 M. DEPTH TO WATER TABLE: 3.0 M.
HEIGHT SAMPLED: 3.0 M. OVERBURDEN THICKNESS: 0.3 M.
MATERIAL AT BASE: SAND AND GRAVEL
SEE SIEVE ANALYSIS AND PETROGRAPHIC ANALYSIS
ADDITIONAL INFORMATION: GENERAL STRATIGRAPHY:
PIT REHABILITATED, 5 000 CUBIC METRES
REMOVED, MASSIVE TO POORLY BEDDED,
PIT 50 X 70 M., ACCESS BY LOCKED GATE

SIEVE ANALYSIS

	PERCENT PASSING											
	OVERSIZED	3.0	1.5	3/4	3/8	#4	#8	#16	#30	#50	#100	#200 (PLUS 6")
RY592 A (SW-11-005-16W)		91	85	75	68	63	57	49	39	24	13	9 MODERATE

(NOTE: ALL SAMPLES ARE 100% PASSING 6 INCHES)

PETROGRAPHIC ANALYSIS(19.1-38.1 mm.)

SAMPLE	% GOOD	% FAIR	% POOR	% DELETERIOUS	% SHALE (BY WEIGHT)	COMMENTS
RY592 A	4	53	43	0	***	SHALE 4.7-9.5 MM. = 8 %

DEPOSIT # 011966

INITIAL LOCATION	PERCENT RESERVES (m^3)	REMAINING DEPLETED	RESERVES (m^3)	OWNER (SURFACE/GRAVEL)	OWNER 2 (SURFACE/GRAVEL)
NW-25-004-16W	227500	30	159250	PRIVATE/PRIVATE	
SW-25-004-16W	52500	0	52500	PRIVATE/PRIVATE	
	DEPOSIT RESERVES		211750		

EXPOSURE INFORMATION

EXPOSURE #: RY591 (NW-25-004-16W) VISITED: 90
EXPOSURE TYPE: SAND AND GRAVEL PIT LAND USE: ACTIVE PIT
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 3.5 METRES ESTIMATED STONE CONTENT: LOW
SECTION: A MATERIAL DESCRIPTION: PEBBLY COARSE SAND
SECTION HEIGHT: 3.5 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 3.0 M. OVERBURDEN THICKNESS: 0.3 M.
MATERIAL AT BASE: SAND
SEE SIEVE ANALYSIS AND PETROGRAPHIC ANALYSIS

ADDITIONAL INFORMATION: GENERAL STRATIGRAPHY:
PIT 150 X 60 M., BEDDED PEBBLY COARSE SAND DIPPING TO EAST, 20 CUBIC METRES STOCKPILE <2.5 CM. MATERIAL, POORLY MANAGED

SIEVE ANALYSIS

	PERCENT PASSING											
	OVERSIZED	3.0	1.5	3/4	3/8	#4	#8	#16	#30	#50	#100	#200 (PLUS 6")
RY591 A (NW-25-004-16W)		100	100	94	85	74	61	41	23	16	10	10 SPARSE

(NOTE: ALL SAMPLES ARE 100% PASSING 6 INCHES)

PETROGRAPHIC ANALYSIS(19.1-38.1 mm.)

SAMPLE	% GOOD	% FAIR	% POOR	% DELETERIOUS	% SHALE (BY WEIGHT)	COMMENTS
RY591 A	26	29	19	25	18	SHALE 4.7-9.5 MM. = 23%

DEPOSIT # 011967

INITIAL LOCATION	PERCENT RESERVES (m^3)	REMAINING DEPLETED	RESERVES (m^3)	OWNER (SURFACE/GRAVEL)	OWNER 2 (SURFACE/GRAVEL)
SW-25-004-16W	510000	85	76500	PRIVATE/PRIVATE	
SE-26-004-16W	30000	0	30000	PRIVATE/PRIVATE	
	DEPOSIT RESERVES		106500		

EXPOSURE INFORMATION

EXPOSURE #: RY590 (SW-25-004-16W)
EXPOSURE TYPE: BORROW PIT

ECONOMIC THICKNESS: 6.0 METRES
SECTION: A MATERIAL DESCRIPTION:
SECTION HEIGHT: 6.0 M.
HEIGHT SAMPLED: 5.0 M.
MATERIAL AT BASE: SAND
SEE SIEVE ANALYSIS AND PETROGRAPHIC ANALYSIS

ADDITIONAL INFORMATION:
2 PITS NEXT TO ROAD ALLOWANCE, 100
CUBIC METRES REMOVED FROM TERRACE
ON SMALL MELTWATER CHANNEL.
PIT 15 X 15 M.

VISITED: 90
LAND USE: PIT-TEMPORARY USE
SURROUNDING LAND USE: AGRICULTURE,HAYING
ESTIMATED STONE CONTENT: LOW
COARSE SAND OCCASIONAL PEBBLE
DEPTH TO WATER TABLE: M.
OVERBURDEN THICKNESS: 0.3 M.

GENERAL STRATIGRAPHY:

SIEVE ANALYSIS

PERCENT PASSING

	OVERSIZED	3.0	1.5	3/4	3/8	#4	#8	#16	#30	#50	#100	#200 (PLUS 6")
RY590 A (SW-25-004-16W)	100	98	94	89	84	77	62	30	14	10	9	SPARSE

(NOTE: ALL SAMPLES ARE 100% PASSING 6 INCHES)

PETROGRAPHIC ANALYSIS(19.1-38.1 mm.)

SAMPLE	% GOOD	% FAIR	% POOR	% DELETERIOUS	% SHALE (BY WEIGHT)	COMMENTS
RY590 A	17	44	20	18	22	SHALE 4.7-9.5 MM. = 16 %

DEPOSIT # 011968

INITIAL LOCATION	PERCENT RESERVES (m^3)	REMAINING DEPLETED	RESERVES (m^3)	OWNER (SURFACE/GRAVEL)	OWNER 2 (SURFACE/GRAVEL)
NW-04-004-15W	120000	90	12000	PRIVATE/PRIVATE	
	DEPOSIT RESERVES		12000		

EXPOSURE INFORMATION

EXPOSURE #: RY589 (SW-09-004-15W) VISITED: 90
EXPOSURE TYPE: SAND AND GRAVEL PIT LAND USE: PIT-TEMPORARY USE
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 2.0 METRES ESTIMATED STONE CONTENT: LOW
SECTION: A MATERIAL DESCRIPTION: PEBBLY SAND
SECTION HEIGHT: 2.0 M. DEPTH TO WATER TABLE: 2.0 M.
HEIGHT SAMPLED: 1.5 M. OVERBURDEN THICKNESS: 0.5 M.
MATERIAL AT BASE: SAND AND GRAVEL
SEE SIEVE ANALYSIS AND PETROGRAPHIC ANALYSIS
ADDITIONAL INFORMATION: GENERAL STRATIGRAPHY:
PIT 100 X 60 M., 10 000 CUBIC METRES REMOVED, MINED TO WATER TABLE, 500 CUBIC METRE STOCKPILE, NO STRIPPING AHEAD OF PIT, PEBBLES INCRUSTED

SIEVE ANALYSIS

	PERCENT PASSING											
	OVERSIZED	3.0	1.5	3/4	3/8	#4	#8	#16	#30	#50	#100	#200 (PLUS 6")
RY589 A (SW-09-004-15W)		100	98	94	88	82	72	56	34	17	9	8 SPARSE

(NOTE: ALL SAMPLES ARE 100% PASSING 6 INCHES)

PETROGRAPHIC ANALYSIS(19.1-38.1 mm.)

SAMPLE	% GOOD	% FAIR	% POOR	% DELETERIOUS	% SHALE (BY WEIGHT)	COMMENTS
RY589 A	1	18	57	24	27	SHALE 4.7-9.5 MM. = N/A

DEPOSIT # 011969

INITIAL LOCATION	PERCENT RESERVES (m^3)	REMAINING DEPLETED	RESERVES (m^3)	OWNER (SURFACE/GRAVEL)	OWNER 2 (SURFACE/GRAVEL)
NW-25-003-15W	20000	0	20000	PRIVATE/PRIVATE	
SW-25-003-15W	340000	0	340000	PRIVATE/PRIVATE	
NE-26-003-15W	40000	0	40000	PRIVATE/PRIVATE	
SE-26-003-15W	200000	20	160000	PRIVATE/PRIVATE	
	DEPOSIT RESERVES		560000		

EXPOSURE INFORMATION

EXPOSURE #: BB130 (NW-25-003-15W) VISITED: 90
EXPOSURE TYPE: BACKHOE TEST PIT LAND USE: HIGHWAY,ROADWAY,RAILWAY
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 3.0 METRES ESTIMATED STONE CONTENT: LOW
SECTION: A MATERIAL DESCRIPTION: MEDIUM SAND OVER SILT
SECTION HEIGHT: 4.0 M. DEPTH TO WATER TABLE: 3.7 M.
HEIGHT SAMPLED: 2.0 M. OVERBURDEN THICKNESS: 1.0 M.
MATERIAL AT BASE: SILT
SEE SIEVE ANALYSIS AND PETROGRAPHIC ANALYSIS
ADDITIONAL INFORMATION:
GENERAL STRATIGRAPHY:
0.0-1.0 M. SOIL
1.0-3.0 M. MEDIUM SAND, MASSIVE OCCASIONAL PEBBLE
3.0-4.0 M. SILTY FINE SAND PEBBLE FREE

EXPOSURE #: RY588 (SE-26-003-15W) VISITED: 90
EXPOSURE TYPE: SAND AND GRAVEL PIT LAND USE: PIT-NOT IN USE(COMMONLY REVEGETATED)
SURROUNDING LAND USE: PASTURE,GRAZING
ECONOMIC THICKNESS: 2.0 METRES ESTIMATED STONE CONTENT: MEDIUM
SECTION: A MATERIAL DESCRIPTION: PEBBLY SAND
SECTION HEIGHT: 1.5 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 1.5 M. OVERBURDEN THICKNESS: 0.3 M.
MATERIAL AT BASE: SAND AND GRAVEL
SEE SIEVE ANALYSIS AND PETROGRAPHIC ANALYSIS
ADDITIONAL INFORMATION:
PIT ON ROAD ALLOWANCE, INACTIVE, 500 CUBIC METRES REMOVED, OVERSIZE PRESENT, POOR ACCESS AS ROAD ALLOWANCE FENCED.
GENERAL STRATIGRAPHY:

SIEVE ANALYSIS

	PERCENT PASSING											
	OVERSIZED	3.0	1.5	3/4	3/8	#4	#8	#16	#30	#50	#100	#200 (PLUS 6")
BB130 A (NW-25-003-15W)	100	100	99	98	96	93	88	78	61	37	22	SPARSE
RY588 A (SE-26-003-15W)	100	99	93	81	66	49	31	17	11	9	9	SPARSE

(NOTE: ALL SAMPLES ARE 100% PASSING 6 INCHES)

PETROGRAPHIC ANALYSIS(19.1-38.1 mm.)

SAMPLE	% GOOD	% FAIR	% POOR	% DELETERIOUS	% SHALE (BY WEIGHT)	COMMENTS
RY588 A	3	27	59	12	11	SHALE 4.7-9.5 MM. = 18%

DEPOSIT # 011970

INITIAL LOCATION	PERCENT RESERVES (m^3)	REMAINING DEPLETED	RESERVES (m^3)	OWNER (SURFACE/GRAVEL)	OWNER 2 (SURFACE/GRAVEL)
NE-23-003-15W	7500	0	7500	PRIVATE/PRIVATE	
NW-24-003-15W	50000	0	50000	PRIVATE/PRIVATE	
SW-25-003-15W	20000	0	20000	PRIVATE/PRIVATE	
SE-26-003-15W	60000	0	60000	PRIVATE/PRIVATE	
	DEPOSIT RESERVES		137500		

EXPOSURE INFORMATION

EXPOSURE #: RY624 (NW-24-003-15W) VISITED: 90
EXPOSURE TYPE: DITCH OR ROAD CUT LAND USE: HIGHWAY,ROADWAY,RAILWAY
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 1.5 METRES ESTIMATED STONE CONTENT: LOW
SECTION: A MATERIAL DESCRIPTION: COARSE PEBBLY SAND
SECTION HEIGHT: 1.5 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 0.0 M. OVERBURDEN THICKNESS: 0.2 M.
MATERIAL AT BASE: SAND AND GRAVEL
NO CHANNEL SAMPLE TAKEN
ADDITIONAL INFORMATION: GENERAL STRATIGRAPHY:

DEPOSIT # 011971

INITIAL LOCATION	PERCENT RESERVES (m^3)	REMAINING DEPLETED	RESERVES (m^3)	OWNER (SURFACE/GRAVEL)	OWNER 2 (SURFACE/GRAVEL)
NE-14-005-15W	15000	0	15000	PRIVATE/PRIVATE	
NW-14-005-15W	240000	30	168000	PRIVATE/PRIVATE	
NE-15-005-15W	180000	0	180000	PRIVATE/PRIVATE	
	DEPOSIT RESERVES		363000		

EXPOSURE INFORMATION

EXPOSURE #: BB158 (NE-15-005-15W) VISITED: 90
EXPOSURE TYPE: BACKHOE TEST PIT LAND USE: HIGHWAY,ROADWAY,RAILWAY
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 3.0 METRES ESTIMATED STONE CONTENT: MEDIUM
SECTION: A MATERIAL DESCRIPTION: PEBBLE GRAVEL
SECTION HEIGHT: 3.7 M. DEPTH TO WATER TABLE: 1.5 M.
HEIGHT SAMPLED: 1.5 M. OVERBURDEN THICKNESS: 0.2 M.
MATERIAL AT BASE: TILL
SEE SIEVE ANALYSIS AND PETROGRAPHIC ANALYSIS
ADDITIONAL INFORMATION:
HOLE FILLED IN WITH WATER AT 3.0 M.

GENERAL STRATIGRAPHY:
0.0-0.2 M. SOIL
0.2-3.0 M. SANDY PEBBLE GRAVEL, SHALE RICH
3.0-3.7 M. SILTY TILL

EXPOSURE #: RY606 (NE-15-005-15W) VISITED: 90
EXPOSURE TYPE: HAND DUG HOLE LAND USE: HIGHWAY,ROADWAY,RAILWAY
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 0.5 METRES ESTIMATED STONE CONTENT: LOW
SECTION: A MATERIAL DESCRIPTION: PEBBLY SAND
SECTION HEIGHT: 0.5 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 0.0 M. OVERBURDEN THICKNESS: 0.3 M.
MATERIAL AT BASE: SAND AND GRAVEL
NO CHANNEL SAMPLE TAKEN
ADDITIONAL INFORMATION: GENERAL STRATIGRAPHY:
SHALE RICH ESKER DEPOSIT

SIEVE ANALYSIS

	PERCENT PASSING											
	OVERSIZED	3.0	1.5	3/4	3/8	#4	#8	#16	#30	#50	#100	#200 (PLUS 6")
BB158 A (NE-15-005-15W)	100	97	78	68	54	45	37	29	22	18	17	SPARSE

(NOTE: ALL SAMPLES ARE 100% PASSING 6 INCHES)

PETROGRAPHIC ANALYSIS(19.1-38.1 mm.)

SAMPLE	% GOOD	% FAIR	% POOR	% DELETERIOUS	% SHALE (BY WEIGHT)	COMMENTS
BB158 A	6	0	1	93	8	SHALE 4.7-9.5 MM. = 83 %

DEPOSIT # 011972

INITIAL LOCATION	PERCENT RESERVES (m^3)	REMAINING DEPLETED	RESERVES (m^3)	OWNER (SURFACE/GRAVEL)	OWNER 2 (SURFACE/GRAVEL)
NE-22-005-15W	13000	0	13000	PRIVATE/PRIVATE	
NW-23-005-15W	123500	0	123500	PRIVATE/PRIVATE	
	DEPOSIT RESERVES		136500		

EXPOSURE INFORMATION

EXPOSURE #: BB165 (NE-22-005-15W) VISITED: 90
EXPOSURE TYPE: BACKHOE TEST PIT LAND USE: HIGHWAY,ROADWAY,RAILWAY
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 1.3 METRES ESTIMATED STONE CONTENT: LOW
SECTION: A MATERIAL DESCRIPTION: PEBBLY COARSE SAND
SECTION HEIGHT: 2.0 M. DEPTH TO WATER TABLE: 1.5 M.
HEIGHT SAMPLED: 1.2 M. OVERBURDEN THICKNESS: 0.2 M.
MATERIAL AT BASE: SILT
SEE SIEVE ANALYSIS AND PETROGRAPHIC ANALYSIS
ADDITIONAL INFORMATION:
HOLE CAVING IN AT 2.2 M. AND
ABANDONED
GENERAL STRATIGRAPHY:
0.0-0.2 M. SOIL
0.2-1.5 M. BEDDED PEBBLY COARSE SAND, SHALE RICH
1.5-2.2 M. BEDDED SILT

EXPOSURE #: RY609 (NW-23-005-15W) VISITED: 90

EXPOSURE TYPE: DITCH OR ROAD CUT LAND USE: HIGHWAY,ROADWAY,RAILWAY

SURROUNDING LAND USE: AGRICULTURE,HAYING

ECONOMIC THICKNESS: 1.5 METRES ESTIMATED STONE CONTENT: MEDIUM LOW

SECTION: A MATERIAL DESCRIPTION: SHALE RICH PEBBLE GRAVEL

SECTION HEIGHT: 1.5 M. DEPTH TO WATER TABLE: M.

HEIGHT SAMPLED: 0.0 M. OVERBURDEN THICKNESS: 0.3 M.

MATERIAL AT BASE: SAND AND GRAVEL

NO CHANNEL SAMPLE TAKEN

ADDITIONAL INFORMATION: GENERAL STRATIGRAPHY:

TILL ON FLANKS OF GRAVEL RIDGE

SIEVE ANALYSIS

	PERCENT PASSING										
	OVERSIZED	3.0	1.5	3/4	3/8	#4	#8	#16	#30	#50	#100	#200 (PLUS 6")
BB165 A (NE-22-005-15W)		100	98	91	85	78	69	58	46	35	26	22

(NOTE: ALL SAMPLES ARE 100% PASSING 6 INCHES)

PETROGRAPHIC ANALYSIS(19.1-38.1 mm.)

SAMPLE	% GOOD	% FAIR	% POOR	% DELETERIOUS	% SHALE (BY WEIGHT)	COMMENTS
BB165 A	7	0	10	83	77	SHALE 4.7-9.5 MM. = 87%

DEPOSIT # 011973

INITIAL LOCATION	PERCENT RESERVES (m^3)	REMAINING DEPLETED	RESERVES (m^3)	OWNER (SURFACE/GRAVEL)	OWNER 2 (SURFACE/GRAVEL)
NE-21-005-15W	15000	90	1500	PRIVATE/PRIVATE	
SE-28-005-15W	25000	90	2500	PRIVATE/PRIVATE	
	DEPOSIT RESERVES		4000		

EXPOSURE INFORMATION

EXPOSURE #: BB164 (SE-28-005-15W) VISITED: 90
EXPOSURE TYPE: BACKHOE TEST PIT LAND USE: HIGHWAY,ROADWAY,RAILWAY
SURROUNDING LAND USE: PASTURE,GRAZING
ECONOMIC THICKNESS: 0.0 METRES ESTIMATED STONE CONTENT :
SECTION: A MATERIAL DESCRIPTION: FINE SAND VENEER OVER SILT
SECTION HEIGHT: 4.0 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 0.0 M. OVERBURDEN THICKNESS: 0.2 M.
MATERIAL AT BASE: SAND AND GRAVEL
NO CHANNEL SAMPLE TAKEN
ADDITIONAL INFORMATION:
UNECONOMIC

GENERAL STRATIGRAPHY:
0.0-0.2 M. SOIL
0.2-1.2 M. FINE SAND, HORIZONTALLY BEDDED PEBBLE FREE
1.2-3.5 M. BEDDED SILT
3.5-4.0 M. PEBBLY COARSE SAND

EXPOSURE #: RY632 (SW-28-005-15W) VISITED: 90
EXPOSURE TYPE: DITCH OR ROAD CUT LAND USE: HIGHWAY,ROADWAY,RAILWAY
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 2.0 METRES ESTIMATED STONE CONTENT: MEDIUM
SECTION: A MATERIAL DESCRIPTION: PEBBLY SAND OVER SILT
SECTION HEIGHT: 2.0 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 0.0 M. OVERBURDEN THICKNESS: 0.0 M.
MATERIAL AT BASE: SILT
NO CHANNEL SAMPLE TAKEN
ADDITIONAL INFORMATION:
SILT ON FLANKS OF 2 M. HIGH ROADCUT OF PEBBLY SAND

GENERAL STRATIGRAPHY:

DEPOSIT # 011974

INITIAL LOCATION	PERCENT RESERVES (m^3)	REMAINING DEPLETED	RESERVES (m^3)	OWNER (SURFACE/GRAVEL)	OWNER 2 (SURFACE/GRAVEL)
NW-27-005-15W	100000	0	100000	PRIVATE/PRIVATE	
	DEPOSIT RESERVES		100000		

EXPOSURE INFORMATION

EXPOSURE #:BB166 (NW-27-005-15W)VISITED:90
EXPOSURE TYPE: BACKHOE TEST PIT
LAND USE: HIGHWAY,ROADWAY,RAILWAY
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 2.5 METRES
ESTIMATED STONE CONTENT: MEDIUM
SECTION: A MATERIAL DESCRIPTION: PEBBLY COARSE SAND SHALE RICH
SECTION HEIGHT: 2.5 M.
DEPTH TO WATER TABLE: 1.0 M.
HEIGHT SAMPLED: 0.0 M.
OVERBURDEN THICKNESS: 0.1 M.
MATERIAL AT BASE: GRAVEL
NO CHANNEL SAMPLE TAKEN

ADDITIONAL INFORMATION:
HOLE CAVED IN AT 2.5 M., NO SAMPLE

GENERAL STRATIGRAPHY:
0.0-0.1 M. SOIL
0.1-1.5 M. PEBBLY COARSE SAND, WET, SHALE RICH WITH OCCASIONAL SHALE COBBLE
1.5-2.5 M. COBBLY SHALE RICH PEBBLE GRAVEL

DEPOSIT # 011975

INITIAL LOCATION	PERCENT RESERVES (m^3)	REMAINING DEPLETED	RESERVES (m^3)	OWNER (SURFACE/GRAVEL)	OWNER 2 (SURFACE/GRAVEL)
NW-27-005-15W	30000	70	9000	PRIVATE/PRIVATE	
	DEPOSIT RESERVES		9000		

EXPOSURE INFORMATION

EXPOSURE #: RY610 (NW-27-005-15W)
VISITED: 90
EXPOSURE TYPE: BORROW PIT
LAND USE: PIT-NOT IN USE(COMMONLY REVEGETATED)
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 2.0 METRES
ESTIMATED STONE CONTENT: LOW
SECTION: A MATERIAL DESCRIPTION: PEBBLY SAND
SECTION HEIGHT: 2.0 M.
DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 1.5 M.
OVERBURDEN THICKNESS: 0.2 M.
MATERIAL AT BASE: SAND
SEE SIEVE ANALYSIS AND PETROGRAPHIC ANALYSIS

ADDITIONAL INFORMATION:
POORLY HORIZONTAL BEDDED SHALE RICH
PEBBLY SAND, BEDS OF SILT AND CLAY,
5 CUBIC METRES REMOVED

GENERAL STRATIGRAPHY:

SIEVE ANALYSIS

	PERCENT PASSING											
	OVERSIZED	3.0	1.5	3/4	3/8	#4	#8	#16	#30	#50	#100	#200 (PLUS 6")
RY610 A (NW-27-005-15W)		100	99	95	90	84	79	74	67	51	33	22 SPARSE

(NOTE: ALL SAMPLES ARE 100% PASSING 6 INCHES)

PETROGRAPHIC ANALYSIS(19.1-38.1 mm.)

SAMPLE	% GOOD	% FAIR	% POOR	% DELETERIOUS	% SHALE (BY WEIGHT)	COMMENTS
RY610 A	6	0	11	84	58	SHALE 4.7-9.5 MM. = N/A

DEPOSIT # 011976

INITIAL LOCATION	PERCENT RESERVES (m^3)	REMAINING DEPLETED	RESERVES (m^3)	OWNER (SURFACE/GRAVEL)	OWNER 2 (SURFACE/GRAVEL)
NE-34-005-15W	340000	0	340000	PRIVATE/PRIVATE	
NW-34-005-15W	340000	0	340000	PRIVATE/PRIVATE	
SE-34-005-15W	80000	0	80000	PRIVATE/PRIVATE	
SW-34-005-15W	140000	0	140000	PRIVATE/PRIVATE	
SE-03-006-15W	320000	0	320000	PRIVATE/PRIVATE	
SW-03-006-15W	40000	0	40000	PRIVATE/PRIVATE	
	DEPOSIT RESERVES		1260000		

EXPOSURE INFORMATION

EXPOSURE #: BB167 (NE-34-005-15W) VISITED: 90
EXPOSURE TYPE: BACKHOE TEST PIT LAND USE: HIGHWAY,ROADWAY,RAILWAY
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 4.0 METRES ESTIMATED STONE CONTENT: LOW
SECTION: A MATERIAL DESCRIPTION: FINE AND COARSE PEBBLY SAND
SECTION HEIGHT: 4.0 M. DEPTH TO WATER TABLE: 3.8 M.
HEIGHT SAMPLED: 2.5 M. OVERBURDEN THICKNESS: 0.2 M.
MATERIAL AT BASE: SAND AND GRAVEL
SEE SIEVE ANALYSIS AND PETROGRAPHIC ANALYSIS
ADDITIONAL INFORMATION:

GENERAL STRATIGRAPHY:
0.0-0.2 M. SOIL
0.2-2.0 M. PEBBLY FINE SAND AND SILTY FINE SAND, BEDS DIPPING TOWARDS SOUTH
2.0-4.0 M. PEBBLY COARSE SAND, MASSIVE LARGE BOULDERS AT 4.0 M.

EXPOSURE #: RY611 (NE-34-005-15W) VISITED: 90
EXPOSURE TYPE: DITCH OR ROAD CUT LAND USE: HIGHWAY,ROADWAY,RAILWAY
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 0.5 METRES ESTIMATED STONE CONTENT: MEDIUM LOW
SECTION: A MATERIAL DESCRIPTION: PEBBLY COARSE SAND
SECTION HEIGHT: 0.5 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 0.0 M. OVERBURDEN THICKNESS: 0.2 M.
MATERIAL AT BASE: SAND AND GRAVEL
NO CHANNEL SAMPLE TAKEN
ADDITIONAL INFORMATION:
POSSIBLE ESKER

GENERAL STRATIGRAPHY:

SIEVE ANALYSIS

	PERCENT PASSING											
	OVERSIZED	3.0	1.5	3/4	3/8	#4	#8	#16	#30	#50	#100	#200 (PLUS 6")
BB167 A (NE-34-005-15W)		100	100	99	98	93	82	60	35	18	12	10 SPARSE

(NOTE: ALL SAMPLES ARE 100% PASSING 6 INCHES)

PETROGRAPHIC ANALYSIS(19.1-38.1 mm.)

SAMPLE	% GOOD	% FAIR	% POOR	% DELETERIOUS	% SHALE (BY WEIGHT)	COMMENTS
BB167 A	***	***	***	***	***	SHALE 4.7-9.5 MM. = 77 %

DEPOSIT # 011977

INITIAL LOCATION	PERCENT RESERVES (m^3)	REMAINING DEPLETED	RESERVES (m^3)	OWNER (SURFACE/GRAVEL)	OWNER 2 (SURFACE/GRAVEL)
NW-30-006-15W	85000	99	850	PRIVATE/PRIVATE	
NE-25-006-16W	60000	0	60000	PRIVATE/PRIVATE	
	DEPOSIT RESERVES		60850		

EXPOSURE INFORMATION

EXPOSURE #: RY603 (NW-30-006-15W) VISITED: 90

EXPOSURE TYPE: SAND AND GRAVEL PIT LAND USE: PIT-NOT IN USE(COMMONLY REVEGETATED)

SURROUNDING LAND USE: PASTURE,GRAZING

ECONOMIC THICKNESS: 1.0 METRES ESTIMATED STONE CONTENT: MEDIUM HIGH

SECTION: A MATERIAL DESCRIPTION: COBBLY PEBBLY GRAVEL OVER SHALE

SECTION HEIGHT: 1.0 M. DEPTH TO WATER TABLE: 1.0 M.

HEIGHT SAMPLED: 0.0 M. OVERBURDEN THICKNESS: 0.2 M.

MATERIAL AT BASE: BEDROCK

NO CHANNEL SAMPLE TAKEN

ADDITIONAL INFORMATION:

1.0 M. GRAVEL OVER BEDROCK, DEPLETED AND OVERGROWN, 2 000 CUBIC METRES REMOVED, UNECONOMIC AS TOO SHALLOW AND POORLY MINED

GENERAL STRATIGRAPHY:

DEPOSIT # 011978

INITIAL LOCATION	PERCENT RESERVES (m^3)	REMAINING DEPLETED	RESERVES (m^3)	OWNER (SURFACE/GRAVEL)	OWNER 2 (SURFACE/GRAVEL)
SE-13-006-15W	234000	0	234000	PRIVATE/PRIVATE	
	DEPOSIT RESERVES		234000		

TOTAL REPORT RESERVES **52439675**

ADDITIONAL INFORMATION (DATA NOT INCLUDED IN MAPPED DEPOSITS)

EXPOSURE #: BB141 (SW-26-005-16W) VISITED: 90
EXPOSURE TYPE: BACKHOE TEST PIT LAND USE: HIGHWAY,ROADWAY,RAILWAY
SURROUNDING LAND USE: PASTURE,GRAZING
ECONOMIC THICKNESS: 4.0 METRES ESTIMATED STONE CONTENT: LOW
SECTION: A MATERIAL DESCRIPTION: FINE SAND
SECTION HEIGHT: 4.0 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 2.0 M. OVERBURDEN THICKNESS: 3.0 M.
MATERIAL AT BASE: SAND AND GRAVEL
SEE SIEVE ANALYSIS AND PETROGRAPHIC ANALYSIS
ADDITIONAL INFORMATION:
DEPOSIT UNECONOMIC DUE TO 3.0 M. TILL OVERBURDEN, SEE RY620

GENERAL STRATIGRAPHY:
0.0-3.0 M. SILTY TILL, SEERY620 BACKHOE
3.0-3.5 M. SILTY TILL
3.5-5.5 M. FINE SAND, MASSIVE, OCCASIONAL PEBBLE
5.5-7.0 M. SHALE RICH PEBBLE GRAVEL

SIEVE ANALYSIS

	PERCENT PASSING											
	OVERSIZED	3.0	1.5	3/4	3/8	#4	#8	#16	#30	#50	#100	#200 (PLUS 6")
BB141 A (SW-26-005-16W)		100	100	100	100	99	97	95	92	45	22	18 SPARSE

(NOTE: ALL SAMPLES ARE 100% PASSING 6 INCHES)

EXPOSURE #: BB143 (SW-27-005-16W) VISITED: 90
EXPOSURE TYPE: BACKHOE TEST PIT LAND USE: HIGHWAY,ROADWAY,RAILWAY
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 1.0 METRES ESTIMATED STONE CONTENT: MEDIUM
SECTION: A MATERIAL DESCRIPTION: TILL OVER GRAVEL
SECTION HEIGHT: 4.0 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 0.0 M. OVERBURDEN THICKNESS: 1.3 M.
MATERIAL AT BASE: TILL
NO CHANNEL SAMPLE TAKEN
ADDITIONAL INFORMATION:
UNECONOMIC, 1.0 M. GRAVEL OVERLAIN BY 1.1 M. TILL

GENERAL STRATIGRAPHY:
0.0-0.2 M. SOIL
0.2-1.3 M. SILTY TILL
1.3-2.3 M. COARSE PEBBLE GRAVEL
2.3-4.0 M. SILTY TILL

EXPOSURE #: BB152 (SE-07-006-16W)
EXPOSURE TYPE: BACKHOE TEST PIT
ECONOMIC THICKNESS: 4.0 METRES
SECTION: A MATERIAL DESCRIPTION:
SECTION HEIGHT: 4.0 M.
HEIGHT SAMPLED: 0.0 M.
MATERIAL AT BASE: TILL
NO CHANNEL SAMPLE TAKEN
ADDITIONAL INFORMATION:

VISITED: 90
LAND USE: HIGHWAY,ROADWAY,RAILWAY
SURROUNDING LAND USE: PASTURE,GRAZING
ESTIMATED STONE CONTENT: MEDIUM
SANDY GRAVEL OVER TILL
DEPTH TO WATER TABLE: M.
OVERBURDEN THICKNESS: 0.0 M.

GENERAL STRATIGRAPHY:
0.0-2.0 M. SANDY SILT RICH GRAVEL, OCCASIONAL SAND BED, DIRTY WATER LAID GRAVEL, POOR SAMPLE RECOVERY
2.0-4.0 M. SILTY TILL WITH LARGE SANDY GRAVEL LENS

EXPOSURE #: BB157 (SE-21-005-15W)
EXPOSURE TYPE: BACKHOE TEST PIT
ECONOMIC THICKNESS: 2.2 METRES
SECTION: A MATERIAL DESCRIPTION:
SECTION HEIGHT: 4.0 M.
HEIGHT SAMPLED: 0.0 M.
MATERIAL AT BASE: TILL
NO CHANNEL SAMPLE TAKEN
ADDITIONAL INFORMATION:
UNECONOMIC DUE TO OVERBURDEN

VISITED: 90
LAND USE: HIGHWAY,ROADWAY,RAILWAY
SURROUNDING LAND USE: AGRICULTURE,HAYING
ESTIMATED STONE CONTENT: MEDIUM
PEBBLE GRAVEL OVERLAIN BY TILL
DEPTH TO WATER TABLE: M.
OVERBURDEN THICKNESS: 0.2 M.

GENERAL STRATIGRAPHY:
0.0-0.2 M. SOIL
0.2-2.5 M. SANDY TILL WITH OCCASIONAL GRAVEL LENS
2.5-3.2 M. PEBBLE GRAVEL, WET
3.2-4.0 M. SILTY TILL

EXPOSURE #: BB163 (NW-16-005-15W)
EXPOSURE TYPE: BACKHOE TEST PIT
ECONOMIC THICKNESS: 2.5 METRES
SECTION: A MATERIAL DESCRIPTION:
SECTION HEIGHT: 9.0 M.
HEIGHT SAMPLED: 0.0 M.
MATERIAL AT BASE: TILL
NO CHANNEL SAMPLE TAKEN
ADDITIONAL INFORMATION:
SAND CORED TILL RIDGE, UNECONOMIC DUE TO TILL OVERBURDEN

VISITED: 90
LAND USE: HIGHWAY,ROADWAY,RAILWAY
SURROUNDING LAND USE: AGRICULTURE,HAYING
ESTIMATED STONE CONTENT: LOW
TILL OVER FINE SAND OVER TILL
DEPTH TO WATER TABLE: M.
OVERBURDEN THICKNESS: 0.0 M.

GENERAL STRATIGRAPHY:
0.0-0.2 M. SOIL
0.2-2.0 M. FINE SAND OCCASIONAL PEBBLE AND GRAVEL LENS
2.0-2.5 M. SILTY FINE SAND
2.5-4.0 M. COMPACT SANDY TILL

EXPOSURE #: RY587 (SW-08-004-15W) VISITED: 90
EXPOSURE TYPE: BEDROCK QUARRY LAND USE: PIT-TEMPORARY USE
SURROUNDING LAND USE: RECREATION SITE
ECONOMIC THICKNESS: 5.0 METRES ESTIMATED STONE CONTENT :
SECTION: A MATERIAL DESCRIPTION: SHALE BORROW PIT
SECTION HEIGHT: 5.0 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 0.0 M. OVERBURDEN THICKNESS: 1.0 M.
MATERIAL AT BASE: BEDROCK
NO CHANNEL SAMPLE TAKEN
ADDITIONAL INFORMATION: GENERAL STRATIGRAPHY:
BEDROCK

EXPOSURE #: RY593 (SW-10-005-16W) VISITED: 90
EXPOSURE TYPE: BEDROCK QUARRY LAND USE: PIT-TEMPORARY USE
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 2.5 METRES ESTIMATED STONE CONTENT :
SECTION: A MATERIAL DESCRIPTION: SHALE BORROW PIT
SECTION HEIGHT: 3.5 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 0.0 M. OVERBURDEN THICKNESS: 1.0 M.
MATERIAL AT BASE: BEDROCK
NO CHANNEL SAMPLE TAKEN
ADDITIONAL INFORMATION: GENERAL STRATIGRAPHY:
50 CUBIC METRES REMOVED 0.0-1.0 M. TILL
1.0-3.5 M. SHALE

EXPOSURE #: RY602 (NE-17-005-15W) VISITED: 90
EXPOSURE TYPE: BEDROCK QUARRY LAND USE: PIT-TEMPORARY USE
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 3.0 METRES ESTIMATED STONE CONTENT :
SECTION: A MATERIAL DESCRIPTION: SHALE BORROW PIT
SECTION HEIGHT: 3.0 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 0.0 M. OVERBURDEN THICKNESS: 1.5 M.
MATERIAL AT BASE: BEDROCK
NO CHANNEL SAMPLE TAKEN
ADDITIONAL INFORMATION: GENERAL STRATIGRAPHY:

EXPOSURE #: RY607 (SE-11-005-15W) VISITED: 90
EXPOSURE TYPE: BEDROCK QUARRY LAND USE: PIT-TEMPORARY USE
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 2.5 METRES ESTIMATED STONE CONTENT :
SECTION: A MATERIAL DESCRIPTION: SHALE BORROW PIT
SECTION HEIGHT: 2.5 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 0.0 M. OVERBURDEN THICKNESS: 0.2 M.
MATERIAL AT BASE: BEDROCK
NO CHANNEL SAMPLE TAKEN
ADDITIONAL INFORMATION: GENERAL STRATIGRAPHY:
20 CUBIC METRES REMOVED FROM
ROADSIDE BORROW PIT

EXPOSURE #: RY620 (SW-26-005-16W) VISITED: 90
EXPOSURE TYPE: DITCH OR ROAD CUT LAND USE: HIGHWAY,ROADWAY,RAILWAY
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 0.0 METRES ESTIMATED STONE CONTENT :
SECTION: A MATERIAL DESCRIPTION: TILL OVER PEBBLY SAND
SECTION HEIGHT: 0.0 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 0.0 M. OVERBURDEN THICKNESS: 0.0 M.
MATERIAL AT BASE: SAND
NO CHANNEL SAMPLE TAKEN
ADDITIONAL INFORMATION:

GENERAL STRATIGRAPHY:
0.0-3.0 M. SANDY TILL
3.0-4.0 M. SHALE RICH PEBBLY SAND

EXPOSURE #: RY625 (SW-09-005-15W) VISITED: 90
EXPOSURE TYPE: DITCH OR ROAD CUT LAND USE: HIGHWAY,ROADWAY,RAILWAY
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 1.5 METRES ESTIMATED STONE CONTENT: MEDIUM
SECTION: A MATERIAL DESCRIPTION: TILL OVER PEBBLY SAND
SECTION HEIGHT: 3.5 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 0.0 M. OVERBURDEN THICKNESS: 0.2 M.
MATERIAL AT BASE: SAND AND GRAVEL
NO CHANNEL SAMPLE TAKEN
ADDITIONAL INFORMATION:
UNECONOMIC DUE TO OVERBURDEN

GENERAL STRATIGRAPHY:
0.0-0.2 M. SOIL
0.2-2.0 M. SILTY TILL
2.0-3.5 M. SHALE RICH PEBBLY SAND

EXPOSURE #: RY626 (NW-16-005-15W) VISITED: 90
EXPOSURE TYPE: DITCH OR ROAD CUT LAND USE: HIGHWAY,ROADWAY,RAILWAY
SURROUNDING LAND USE: AGRICULTURE,HAYING
ECONOMIC THICKNESS: 2.0 METRES ESTIMATED STONE CONTENT: LOW
SECTION: A MATERIAL DESCRIPTION: TILL OVERLYING PEBBLY SAND
SECTION HEIGHT: 5.0 M. DEPTH TO WATER TABLE: M.
HEIGHT SAMPLED: 0.0 M. OVERBURDEN THICKNESS: 0.2 M.
MATERIAL AT BASE: SAND
NO CHANNEL SAMPLE TAKEN
ADDITIONAL INFORMATION:
UNECONOMIC DUE TO OVERBURDEN

GENERAL STRATIGRAPHY:
0.0-0.2 M. SOIL
0.2-3.0 M. SANDY TILL
3.0-5.0 M. PEBBLY SAND

EXPOSURE #: RY627 (SW-13-005-15W)
EXPOSURE TYPE: DITCH OR ROAD CUT

ECONOMIC THICKNESS: 1.5 METRES
SECTION: A MATERIAL DESCRIPTION:
SECTION HEIGHT: 3.0 M.
HEIGHT SAMPLED: 0.0 M.
MATERIAL AT BASE: SAND
NO CHANNEL SAMPLE TAKEN
ADDITIONAL INFORMATION:
UNECONOMIC DUE TO OVERBURDEN

VISITED: 90
LAND USE: HIGHWAY,ROADWAY,RAILWAY
SURROUNDING LAND USE: AGRICULTURE,HAYING
ESTIMATED STONE CONTENT: LOW
TILL OVER SAND
DEPTH TO WATER TABLE: 3.5 M.
OVERBURDEN THICKNESS: 0.0 M.

GENERAL STRATIGRAPHY:
0.0-0.2 M. SOIL
0.2-2.0 M. SILTY TILL
2.0-3.5 M. COARSE SAND OCCASIONAL PEBBLE, WATER AT 3.5 M.

EXPOSURE #: RY629 (SW-22-005-15W)
EXPOSURE TYPE: DITCH OR ROAD CUT

ECONOMIC THICKNESS: 1.5 METRES
SECTION: A MATERIAL DESCRIPTION:
SECTION HEIGHT: 1.5 M.
HEIGHT SAMPLED: 0.0 M.
MATERIAL AT BASE: SAND AND GRAVEL
NO CHANNEL SAMPLE TAKEN
ADDITIONAL INFORMATION:
COARSE PEBBLE GRAVEL WITH TILL ON FLANKS OF RAILROAD CUT

VISITED: 90
LAND USE: HIGHWAY,ROADWAY,RAILWAY
SURROUNDING LAND USE: PASTURE,GRAZING
ESTIMATED STONE CONTENT: MEDIUM
PEBBLE GRAVEL
DEPTH TO WATER TABLE: M.
OVERBURDEN THICKNESS: 0.2 M.

GENERAL STRATIGRAPHY:

EXPOSURE #: RY630 (NE-24-005-16W)
EXPOSURE TYPE: DITCH OR ROAD CUT

ECONOMIC THICKNESS: 3.0 METRES
SECTION: A MATERIAL DESCRIPTION:
SECTION HEIGHT: 5.0 M.
HEIGHT SAMPLED: 0.0 M.
MATERIAL AT BASE: TILL
NO CHANNEL SAMPLE TAKEN
ADDITIONAL INFORMATION:

VISITED: 90
LAND USE: HIGHWAY,ROADWAY,RAILWAY
SURROUNDING LAND USE: AGRICULTURE,HAYING
ESTIMATED STONE CONTENT: MEDIUM
SILT OVER PEBBLY SAND OVER TILL
DEPTH TO WATER TABLE: M.
OVERBURDEN THICKNESS: 0.3 M.

GENERAL STRATIGRAPHY:
0.0-0.3 M. SOIL
0.3-2.0 M. SILT
2.0-5.0 M. PEBBLY SAND, MASSIVE
5.0 SILTY TILL

EXPOSURE #: RY631 (SW-19-005-15W) VISITED: 90

EXPOSURE TYPE: DITCH OR ROAD CUT LAND USE: HIGHWAY,ROADWAY,RAILWAY

SURROUNDING LAND USE: AGRICULTURE,HAYING

ECONOMIC THICKNESS: 3.0 METRES ESTIMATED STONE CONTENT: MEDIUM

SECTION: A MATERIAL DESCRIPTION: TILL OVER PEBBLY SAND

SECTION HEIGHT: 7.0 M. DEPTH TO WATER TABLE: M.

HEIGHT SAMPLED: 0.0 M. OVERBURDEN THICKNESS: 4.0 M.

MATERIAL AT BASE: SAND AND GRAVEL

NO CHANNEL SAMPLE TAKEN

ADDITIONAL INFORMATION:

UNECONOMIC DUE TO OVERBURDEN

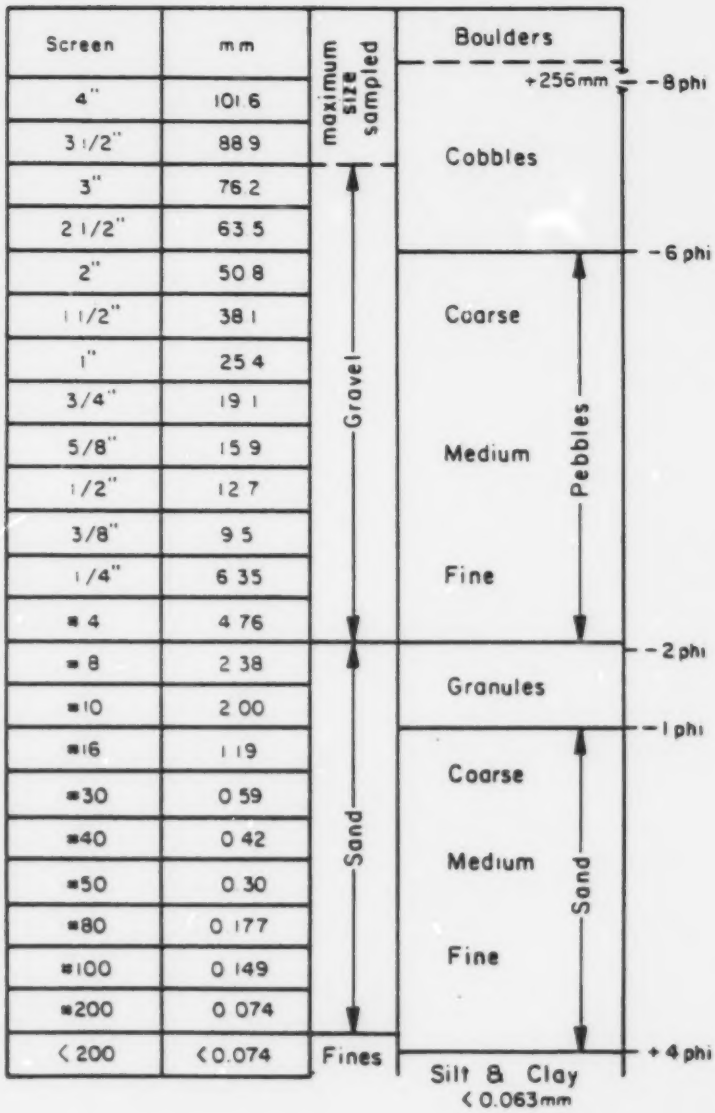
GENERAL STRATIGRAPHY:

0.0-0.2 M. SOIL

0.2-4.0 M. SILTY TILL

4.0-7.0 M. PEBBLY COARSE SAND

APPENDIX B: GRAIN SIZE CLASSIFICATION



APPENDIX C: GLOSSARY

AGGREGATE

Any inert, construction material (sand, gravel, slag, crushed stone or other mineral material).

AGGREGATE RESERVES

Aggregate in a deposit which is proven and is economically signficiant.

ALLUVIUM

Alluvium is a general term for clay, silt, sand, gravel, or similar unconsolidated material deposited during postglacial time by a stream.

BEACH DEPOSITS

These are relatively narrow, linear features formed at the shores of glacial lakes that existed during deglaciation. Well developed beaches are usually less than 20 feet (6 m) thick. The aggregate is well sorted and stratified and sand-sized material commonly predominates.

BEDROCK

In-place pre-Quaternary material exposed at the surface or underlying the surficial material.

BINDER

Material that produces or promotes consolidation in loosely aggregated sediments. Usually mud or clay, sometimes till is used for binder.

CARBONATE ROCKS

A broad term referring to those sedimentary rocks consisting chiefly of carbonate minerals, mainly limestone and dolostone.

CLAST

An individual constituent, grain, or fragment of a sediment or rock, produced by the mechanical weathering of a large rock mass. Synonyms include particle and fragment.

CROWN LAND

Land reserved and administered by the Crown. Sand and gravel usually administered by the Crown.

CROWN SAND AND GRAVEL

Sand and gravel reserved and administered by the Crown.

DELETERIOUS LITHOLOGY

A general term used to designate those rock types which are chemically or physically unsuited for use as construction or road-building aggregates. Such lithologies as chert, shale, siltstone, and sandstone may deteriorate rapidly.

DEPOSIT

An accumulation of sediments left in a new location by a natural transportative agent such as water, wind, ice, or gravity.

An aggregate deposit is a deposit of sand and gravel considered to be of economic significance.

DIRT

See fines.

DOLOMITE (DOLOSTONE)

A carbonate sedimentary rock consisting chiefly of the mineral dolomite and containing relatively little calcite (dolomite is also known as dolostone).

DRIFT

A general term for all unconsolidated rock debris transported from one place and deposited in another; distinguished from underlying bedrock. In North America, glacial activity has been the dominant mode of transport and deposition of drift. Synonyms include overburden and surficial deposit.

DURABLE ROCK

A rock fragment which is hard and inert and can be used as aggregate without breaking, crumbling or reacting with the cementing material.

EOLIAN

Pertaining to wind action.

EPOCH

A geological-time unit longer than an age and a subdivision of a period.

ESKERS

Eskers are narrow, sinuous ridges of sand and gravel. They vary greatly in size. Many eskers consist of a central core of poorly sorted and stratified gravel. The core material is often draped by better sorted and stratified sand and gravel.

FINES

A general term used to describe the size fraction of an aggregate which passes (is finer than) the No. 200 mesh screen (0.074 mm). Also described informally as "dirt", these particles are in the silt- and clay-size range.

FLUVIAL

Pertaining to rivers or streams.

GLACIOFLUVIAL DEPOSITS

Material deposited by streams flowing from, on, or within melting glacier ice, generally composed of sorted, stratified sand and gravel; includes outwash, kame, esker, etc.

GLACIOLACUSTRINE DELTAS

These features were formed where streams or rivers of glacial meltwater flowed into lakes and deposited their suspended sediment. Such deposits tend to consist mainly of sand and abundant silt. However, in near-ice or ice-contact positions, coarse material may be present.

GLACIOLACUSTRINE DEPOSITS

Material deposited in lakes affected by glacier ice or by meltwater flowing directly from glaciers; composed of well-sorted clay, silt, or sand.

GRANULAR BASE COURSE

Components of a road placed on subgrade and designed to provide strength, stability, and drainage, as well as support for surfacing materials. Several types have been defined: Granular Base Course A consists of crushed and processed aggregate and has relatively stringent quality standards in comparison to Granular Base Course B and C which are usually pit-run or other unprocessed aggregate.

GROUND MORAINE

A deposit of till with a flat or undulating surface.

HOLOCENE

An epoch of the Quaternary period covering the time period from the retreat of the continental glaciers to the present, about 10 000 years.

HUMMOCKY

An irregular or knob and kettle surface.

HUMMOCKY MORAINE

A landscape composed primarily of till with a hummocky surface.

ICE-CONTACT DEPOSIT

Material deposited in contact with glacier ice by meltwater; includes kames, eskers, kame terraces, etc.

ICE-CONTACT TERRACES

These are glaciofluvial features deposited between the glacial margin and a confining topographic high, such as the side of a valley. The structure may be similar to outwash deposits.

KAMES

Kames are mounds of poorly sorted sand and gravel deposited by meltwater in depressions or fissures on the ice surface or at its margin. The deposits consist mainly of irregularly bedded and cross-bedded, poorly sorted sand and gravel. Deposits include single mounds, linear ridges (crevasse fillings) or complex groups of landforms.

LACUSTRINE DEPOSIT

Material deposited in a lake.

LITHOLOGY

The description of rocks on the basis of such characteristics as color, structure, mineralogic composition, and grain size. Generally, the description of the physical character of a rock.

MELTWATER CHANNEL

A drainage way produced by water flowing away from a melting glacier margin.

MORAINE

A distinct accumulation of glacial drift. Could represent an ice marginal position.

OUTWASH

Outwash deposits consist of sand and gravel laid down by meltwaters beyond the margin of the ice lobes. They occur as sheets or as terraced valley fills (valley trains) and may be very large in extent and thickness. Well developed outwash deposits have good horizontal bedding and are uniform in grain-size distribution. Outwash deposited near the glacier's margin is much more variable in texture and structure.

PIT RUN

Unprocessed aggregate removed from pit. Generally consists of fine pebble gravel with minor amounts of material coarser than 38 mm (1 1/2"). It is used for road maintenance, upgrading and resurfacing.

PLEISTOCENE

An epoch of the recent geological past including the time from approximately 1.8 million years ago to 10 000 years ago. Much of the Pleistocene was characterized by extensive glacial activity.

QUATERNARY

The second period of the Cenozoic era, thought to cover the last 2-3 million years. It consists of two epochs: The Pleistocene and the Holocene.

RESOURCE

An aggregate deposit or environment which may or may not be proven and is presently not economically significant.

SHALE

A fine-grained, sedimentary rock formed by the consolidation of clay, silt, or mud and characterized by well developed bedding planes, along which the rock breaks readily into thin layers. The term shale is also commonly used for fissile claystone, siltstone, and mudstone.

SPILLWAY

Large drainage valley formed by meltwater flowing from a glacial lake. Spillways often have gravel terraces.

STONE

That component of aggregate coarser than 4.76 mm or the #4 sieve, includes pebbles, cobbles and boulders.

SURFICIAL GEOLOGY

A form of geological mapping dealing with all materials occurring at surface in an area: unlithified or lithified (sediments or bedrock).

TERRACE

A relatively flat, stair-stepped, depositional or erosional surface bounded by an ascending slope on one side and a descending slope on the other.

TILL

Unsorted and unstratified rock debris, deposited directly by glaciers, and ranging in size from clay to large boulders.

WISCONSINAN

Pertaining to the last glacial stage of the Pleistocene Epoch in North America. It began approximately 100 000 years ago and ended approximately 10 000 years ago. The glacial deposits and landforms of southern Manitoba are predominantly the result of glacial activity during the Wisconsinan Stage.

MAPS
NOT
FILMED

CARTES
OMISES